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TEST REPORT

Report No.	CTC20230973E06
Applicant	Lumi United Technology Co., Ltd
Address	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Manufacturer	Lumi United Technology Co., Ltd
Address	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Product Name	Water Leak Sensor T1
Trade Mark	Aqara
Model/Type reference	WLS-S01
Listed Model(s)	SJCGQ12LM, SJCGQ12LM-G0, WL-S02D
Standard	ETSI EN 301 489-1 V2.2.3: 2019-11 ETSI EN 301 489-17 V3.2.4: 2020-09
Date of receipt of test sample...	Apr. 20, 2023
Date of testing	Apr. 21, 2023 ~ Apr. 28, 2023
Date of issue	Apr. 29, 2023
Result	PASS

Compiled by: (Printed name+signature)	Terry Su	 
Supervised by: (Printed name+signature)	Eric Zhang	
Approved by: (Printed name+signature)	Totti Zhao	
Testing Laboratory Name	CTC Laboratories, Inc.	
Address	2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China	

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[ETSI EN 301 489-1 V2.2.3 \(2019-11\)](#)—ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

[ETSI EN 301 489-17 V3.2.4 \(2020-09\)](#)—ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

[EN 55032: 2015 + A11: 2020 + A1: 2020](#)—Electromagnetic compatibility of multimedia equipment—Emission Requirements

[EN 55035: 2017 + A11: 2020](#)—Electromagnetic compatibility of multimedia equipment—Immunity requirements

[EN IEC 61000-3-2: 2019 + A1: 2021](#)—Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

[EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022](#)—Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection

1.2. Report version

Revised No.	Date of issue	Description
01	Apr. 29, 2023	Original



1.3. Test Description

Emission			
Test Item	Standard requirement (ETSI EN301 489-1)	Result	Test Engineer
Radiated Emission	Clause 8.2	Pass	Terry Su
Conducted Emission(AC Mains)	Clause 8.4	N/A	N/A
Conducted Emission(Signal Mains)	Clause 8.4	N/A	N/A
Harmonic Current Emissions	Clause 8.5	N/A	N/A
Voltage Fluctuations and Flicker	Clause 8.6	N/A	N/A
Immunity			
Test Item	Standard requirement (ETSI EN301 489-1)	Result	Test Engineer
Radio Frequency Electromagnetic Field	Clause 9.2	Pass	Terry Su
Electrostatic Discharge	Clause 9.3	Pass	Terry Su
Fast Transients (common mode)	Clause 9.4	N/A	N/A
Radio frequency (common mode)	Clause 9.5	N/A	N/A
Voltage Dips and Interruptions	Clause 9.7	N/A	N/A
Surges	Clause 9.8	N/A	N/A

Note: "N/A" is no application

The measurement uncertainty is not included in the test result.



1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC)Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 " Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



Test	Measurement Frequency Range	U (dB)	Note
Conducted Emission	9kHz ~ 30MHz	3.08	Main Power Port
Conducted Emission	150kHz ~ 30MHz	4.26	Telecommunication
Radiated Emission	30MHz ~ 1000MHz	4.51	3m chamber 2
Radiated Emission	30MHz ~ 1000MHz	4.5	3m chamber 3
Radiated Emission	1GHz ~ 6GHz	5.7	3m chamber 3

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Lative Humidity	55 %
Air Pressure	102kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Lumi United Technology Co., Ltd
Address:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China
Manufacturer:	Lumi United Technology Co., Ltd
Address:	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.2. General Description of EUT

Product Name:	Water Leak Sensor T1
Trade Mark:	Aqara
Model/Type reference:	WLS-S01
Listed Model(s):	SJCGQ12LM, SJCGQ12LM-G0, WL-S02D
Model Difference:	All these models are identical in the same PCB, layout and electrical circuit, only named differently for marketing purpose.
Power supply:	3Vdc from button battery
Hardware version:	V1.0.1
Software version:	V1.0.1
Zigbee	
Modulation:	O-QPSK
Operation frequency:	2405MHz ~ 2480MHz



2.3. Accessory Equipment Information

Equipment Information			
Name	Model	S/N	Manufacturer
Aqara Hub	ZHWG17LM	/	Aqara
Mobile phone	P20 Pro	/	HUAWEI
Router	E8820 V3	---	ZTE

Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/

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2.4. Description of Test Modes

Test mode	Normal Working + Zigbee
1	■

Note:

- is operation mode.

Test item	Test mode
Radiated Emission	T1
Conducted Emission(AC Mains)	N/A
Conducted Emission(Signal Mains)	N/A
Harmonic Current Emissions	N/A
Voltage Fluctuations and Flicker	N/A
Radio Frequency Electromagnetic Field	T1
Electrostatic Discharge	T1
Electrical Fast Transient / Burst	N/A
Injected Current	N/A
Voltage Dips and Interruptions	N/A
Surges	N/A



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2.5. Measurement Instruments List

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101112	Dec. 16, 2023
2	LISN	R&S	ENV216	101113	Dec. 16, 2023
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 16, 2023
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 16, 2023
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 16, 2023
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Radiated Emission (3m chamber 2)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Dec. 07, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-648	Dec. 07, 2024
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024
5	Pre-Amplifier	SONOMA	310	186194	Dec. 16, 2023
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 16, 2023
7	Test Receiver	R&S	ESCI7	100967	Dec. 16, 2023
8	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024
9	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Radiated Emission (3m chamber 3)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	01026	Dec. 18, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 01, 2024
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 16, 2023
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 16, 2023
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 16, 2023
6	3m chamber 3	YIHENG	EE106	/	Sep. 09, 2023
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Harmonic Current Emissions & Voltage Fluctuations and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Universal Power Analyzer	Voltech	PM6000	200006700723	Dec. 16, 2023
2	Programmable AC Power Source	Mtoni	PHF1530	MTPS001	Dec. 16, 2023
3	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023



Electrostatic Discharge

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	ESD Simulator	EM TEST	DITO	V1113109156	Dec. 28, 2023
2	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Fast Transients Common Mode

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Electrical fast transient generator	3ctest	EFT-4003G	EC0471140	Dec. 16, 2023
2	Coupling/Decoupling Clamp	3ctest	EFTC	EC0441141	Dec. 16, 2023
3	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

RF Electromagnetic Field

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	High Gain Log-Periodic Antenna	R&S	HL046E	100037	Dec. 16, 2023
2	Stacked Log.-Per. Antenna	Schwarzbeck	STLP 9149	9149-658	Dec. 16, 2023
3	Power Amplifier	BONN ELEKTRONIK	BLWA0830-160/100/40D	76788	Dec. 16, 2023
4	Power Amplifier	Micotop	MPA-3-6G-50	MPA1706258	Dec. 16, 2023
5	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 16, 2023
7	DUAL DIRECTIONAL COUPLER	AR	DC7144A	0317128	Dec. 16, 2023
8	TRANSMITTING AERIAL	AR	AT4002A	0321644	Dec. 16, 2023
9	Audio Analyzer	Rohde & Schwarz	UPL	SB3439	Dec. 16, 2023
10	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Surges

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Surge generator	3ctest	SG-5006G	EC5581149	Dec. 16, 2023
2	Surge CDN	3ctest	SGN-20G	EC5551128	Dec. 16, 2023
3	Network Surge Generator	3ctest	CWS 600T	ES0311603	Dec. 16, 2023
4	Network Surge CDN	3ctest	CDN 405T8A1	ES2731605	Dec. 16, 2023
5	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023



RF Common Mode					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	C/S Generator	SCHLODER	CDG 6000	126A1266	Dec. 16, 2023
2	Coupling/Decoupling Network	SCHLODER	CDN M2+3	A2210258	Dec. 16, 2023
3	Coupling/Decoupling Network	TESEQ GmbH	CDN T8-10	45011	Dec. 16, 2023
4	6dB Attenuator	N/A	100W/6dB	N/A	Dec. 16, 2023
5	DUAL DIRECTIONAL COUPLER	AR	DC7144A	0317128	Dec. 16, 2023
5	TRANSMITTING AERIAL	AR	AT4002A	0321644	Dec. 16, 2023
6	Audio Analyzer	Rohde & Schwarz	UPL	SB3439	Dec. 16, 2023
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Voltage dips, short interruptions and voltage variations					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Voltage dips and up generator	3ctest	VDG-1105G	EC0171116	Dec. 16, 2023
2	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 16, 2023

Note: The Cal. Interval was one year.

3. EMC EMISSION TEST

3.1. Radiated Emission

LIMIT

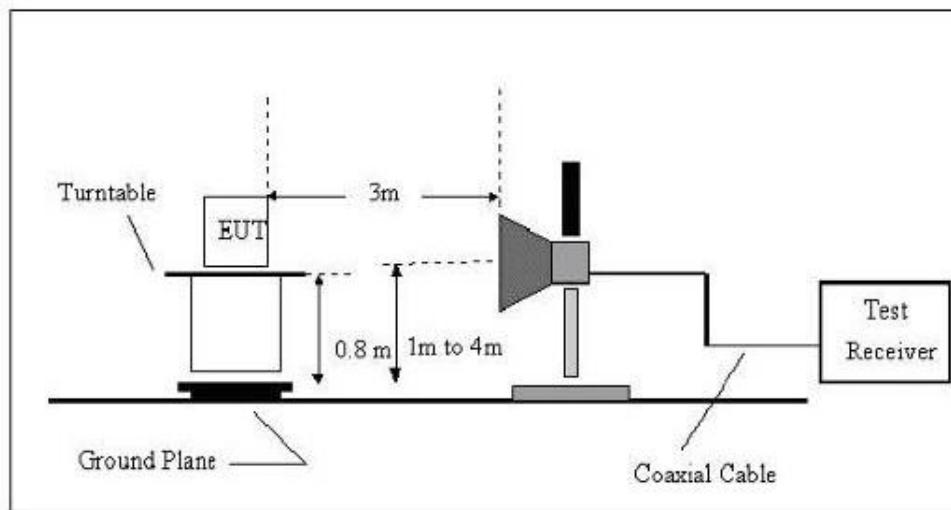
Please refer to ETSI EN301489-1 Clause 8.2.3, Table 4 and CENELEC EN 55032 Annex A Table A.4 & A.5

Frequency range (MHz)	Quasi-peak limits dB μ V/m@3m	Quasi-peak limits dB μ V/m@10m
30~230	40	30
230~1000	47	37

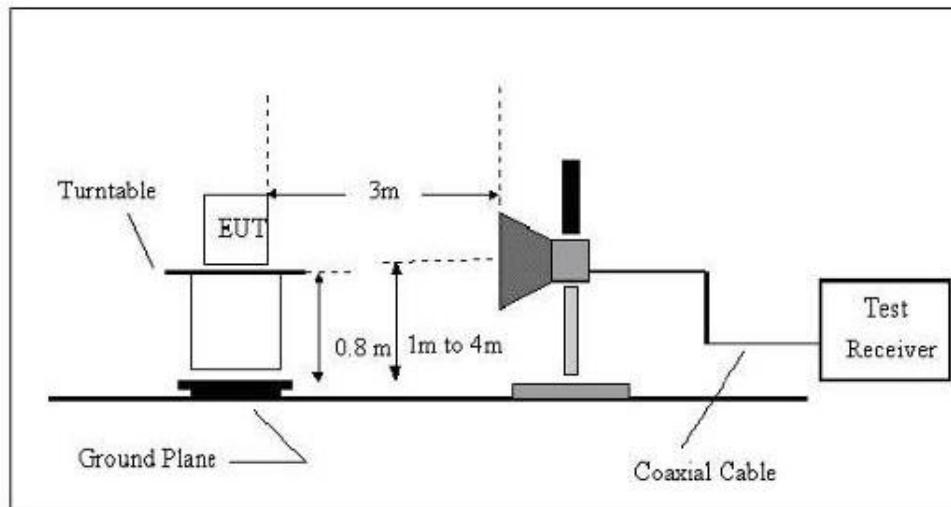
Frequency range (GHz)	Average limits dB μ V/m@3m	Peak limits dB μ V/m@3m
1 ~ 6	54	74

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up Frequency below 1 GHz



(B) Radiated Emission Test Set-Up Frequency above 1GHz





TEST PROCEDURE

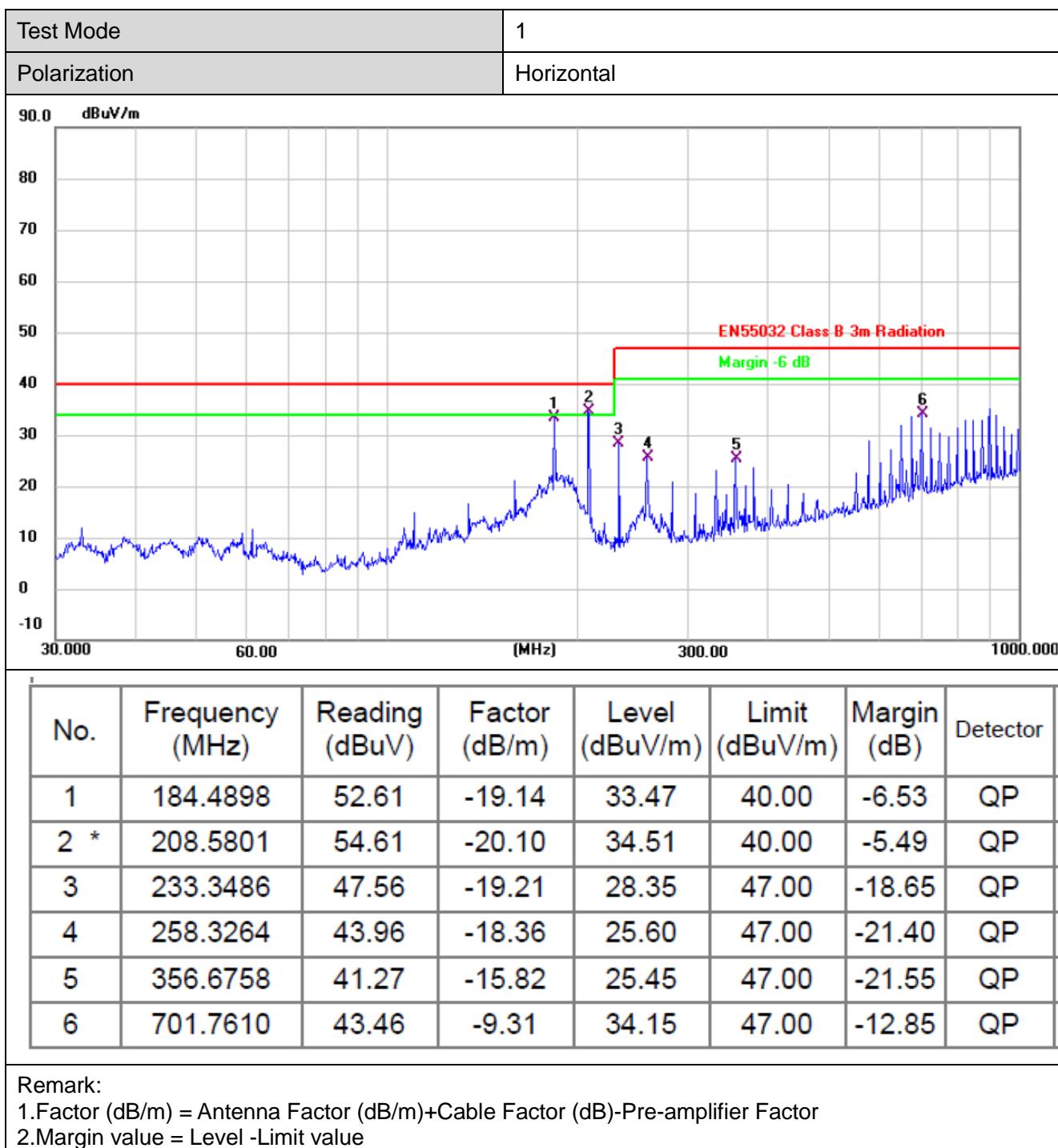
Please refer to ETSI EN 301 489-1 Clause 8.2.3 and CENELEC EN 55032 Clause 6.3 for the measurement methods

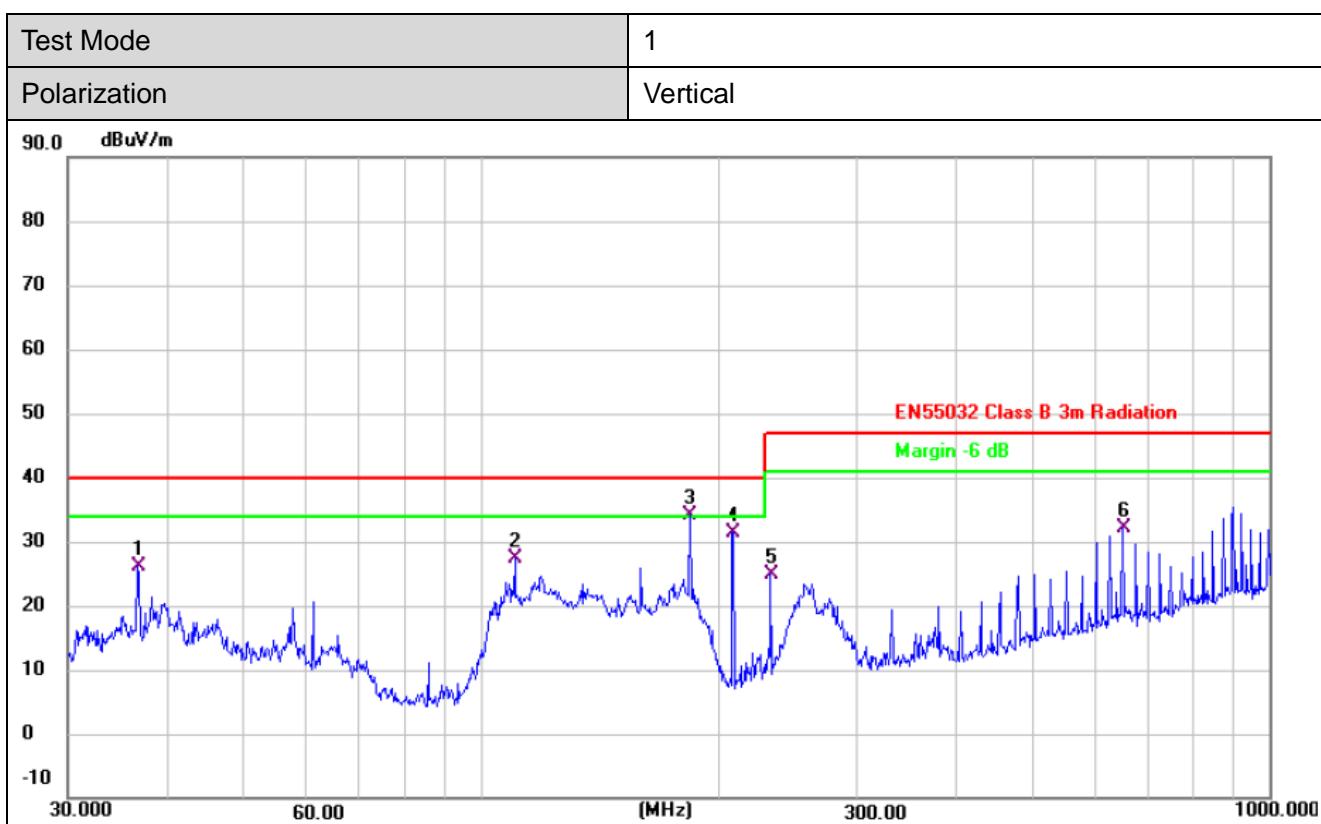
TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

(1) 30MHz-1000MHz



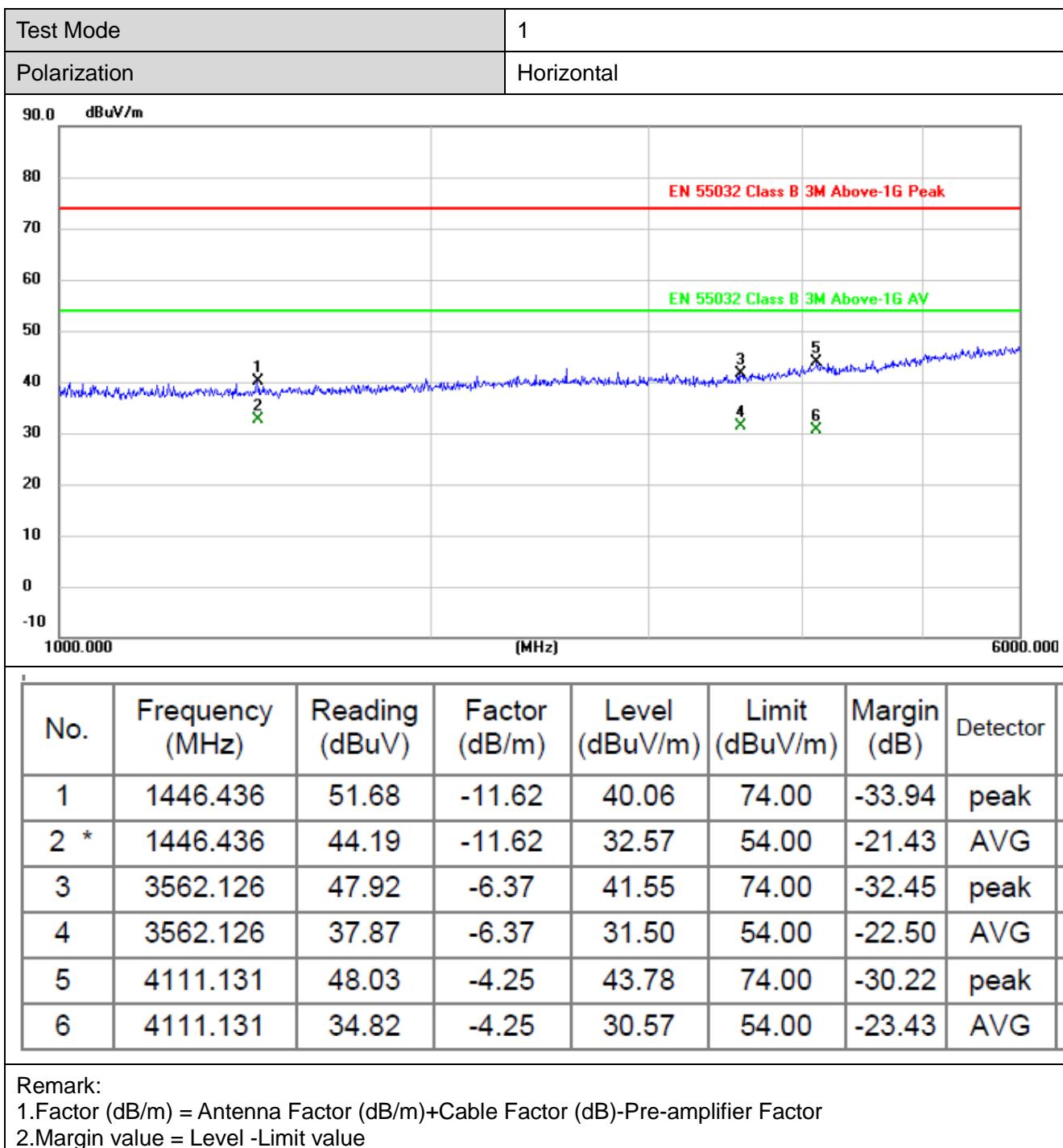


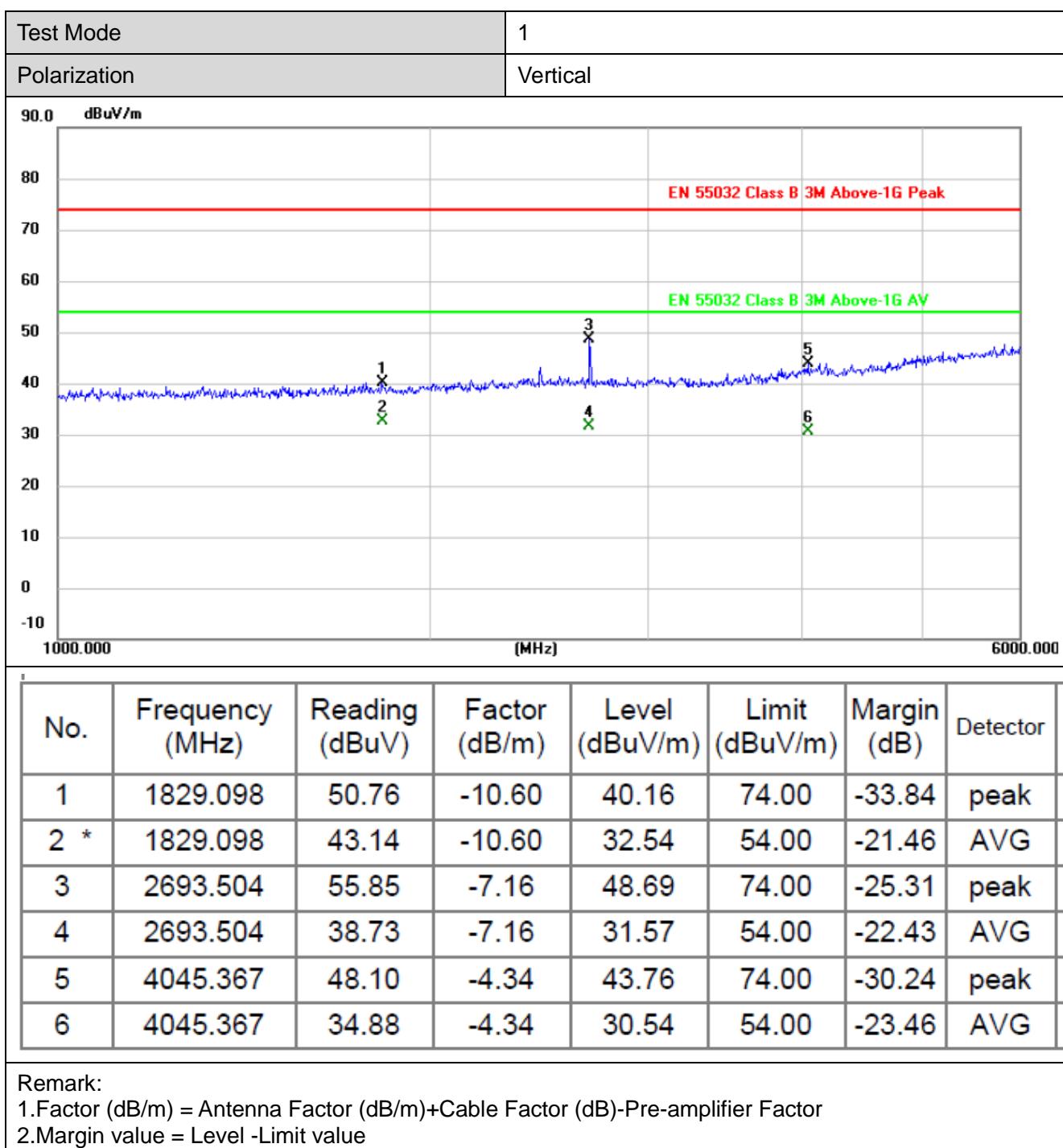
No.	Frequency (MHz)	Reading (dB _{UV})	Factor (dB/m)	Level (dB _{UV} /m)	Limit (dB _{UV} /m)	Margin (dB)	Detector
1	36.7662	43.87	-17.81	26.06	40.00	-13.94	QP
2	110.5687	47.58	-20.10	27.48	40.00	-12.52	QP
3 *	184.4898	53.30	-19.14	34.16	40.00	-5.84	QP
4	209.3129	51.37	-20.08	31.29	40.00	-8.71	QP
5	233.3487	44.06	-19.21	24.85	47.00	-22.15	QP
6	651.9417	41.90	-9.79	32.11	47.00	-14.89	QP

Remark:

1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Margin value = Level -Limit value

(2) Above 1000MHz





3.2. Conducted Emission (AC Mains)

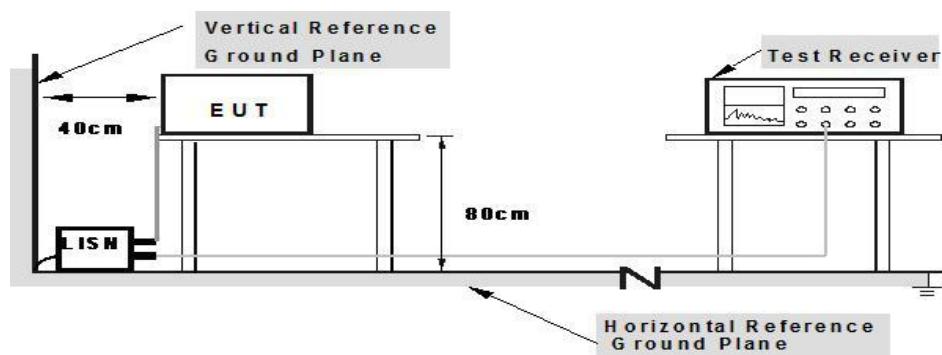
LIMIT

Please refer to ETSI EN301489-1 Clause 8.4.3.2 and CENELEC EN 55032 Annex A3 Table A.10

Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE 1 The lower limit shall apply at the transition frequencies.
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.3 and CENELEC EN 55032 Annex A3 Table A.8

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

3.3. Conducted Emission (Signal Mains)

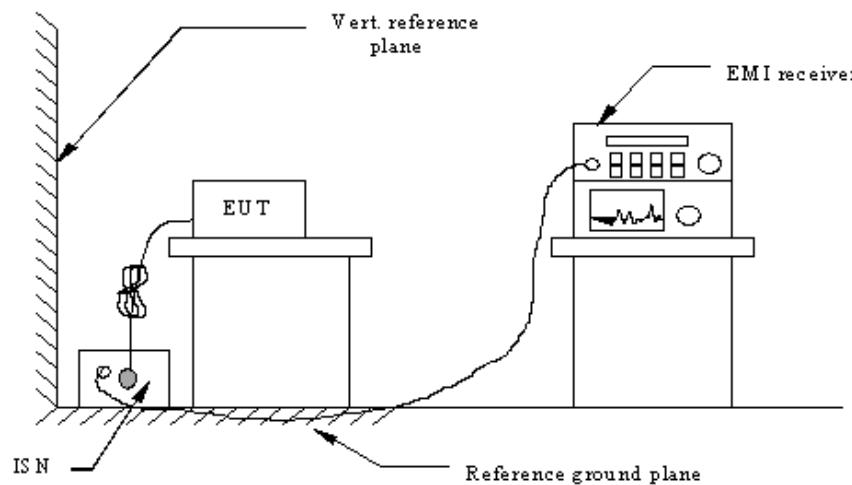
LIMIT

Please refer to ETSI EN301489-1 Clause 8.4.3.2 and CENELEC EN 55032 Annex A Table A.12

Frequency range (MHz)	Voltage Limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 ~ 30	74	64	30	20

Note: if "150Ω to 50Ω adaptor" applied, correction factor of 9.5dB should be added to the test data.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to CENELEC EN 55032 section C4

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.



3.4. Harmonic Current Emission

LIMIT

EN61000-3-2 Clause 7

➤ Class A equipment

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

➤ Class B equipment

not exceed the values givenin Class A limit multiplied by a factor of 1,5

➤ Class C equipment

Active input power >25 W

Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

* λ is the circuit power factor

Active input power ≤ 25 W

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
$13 \leq n \leq 39$ (odd harmonics only)	$3,85 \frac{n}{13}$	See Table 1

or

the third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86 % and the fifth harmonic current shall not exceed 61 %. Also, the waveform of the input current shall be such that it reaches the 5 % current threshold before or at 60°, has its peak value before or at 65° and does not fall below the 5 %current threshold before 90°, referenced to any zero crossing of the fundamental supply voltage. The current threshold is 5 % of the highest absolute peak value that

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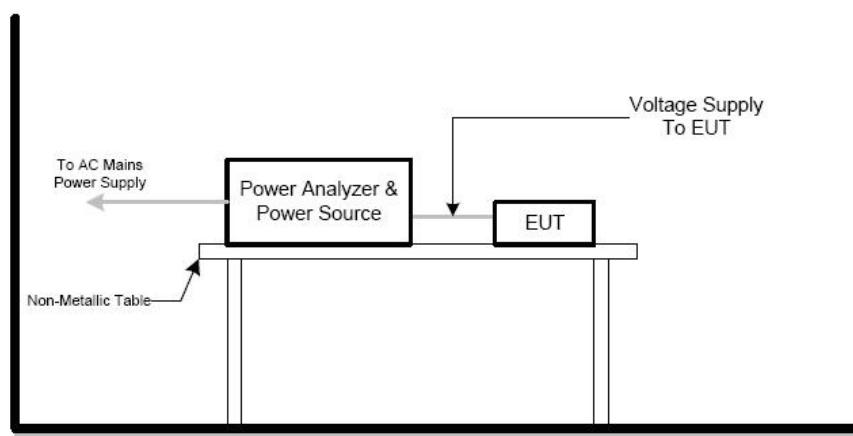
For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : <http://yz.cnca.cn>

occurs in the measurement window, and the phase angle measurements are made on the cycle that includes this absolute peak value

➤ Class D equipment

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
$13 \leq n \leq 39$ (odd harmonics only)	$\frac{3,85}{n}$	See Table 1

TEST CONFIGURATION



TEST PROCEDURE

Please refer to EN61000-3-2 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

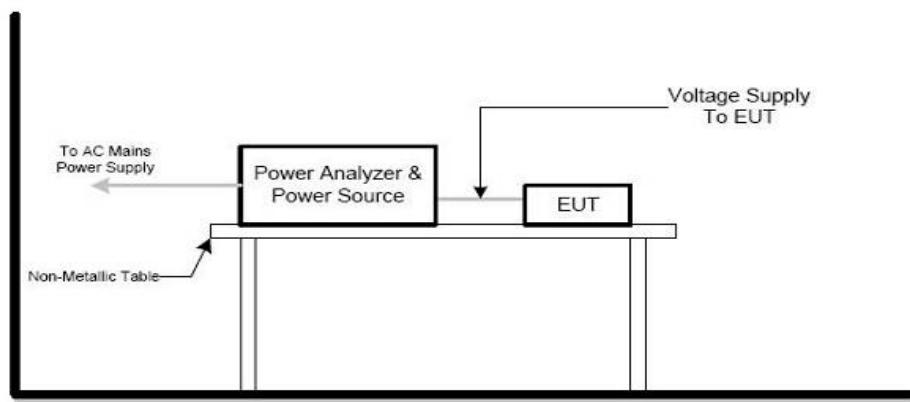
3.5. Voltage Fluctuation and Flicker

LIMIT

Please refer to EN61000-3-3

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-3	
Pst	≤ 1.0 , Tp= 10 min.	≤ 1.0 , Tp= 10 min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65 , Tp=2 hr.	Long Term Flicker Indicator
dc	$\leq 3\%$	$\leq 3.3\%$	Relative Steady-State V-Chang
dmax	$\leq 4\%$	$\leq 4\%$	Maximum Relative V-change
d (t)	N/A	$\leq 3.3\%$ for > 500 ms	Relative V-change characteristic

TEST CONFIGURATION



TEST PROCEDURE

Please refer to EN61000-3-3 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.



4. EMC IMMUNITY TEST

4.1. Performance criteria

- EN301489-17:

General performance criteria

- Performance criteria A for immunity tests with phenomena of a continuous nature;
- Performance criteria B for immunity tests with phenomena of a transient nature;
- Performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following.

Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

NOTE 1:

Degradation of performance during the test is understood as degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2:

No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or NotACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

4.2. Electrostatic Discharge

PERFORMANCE CRITERION

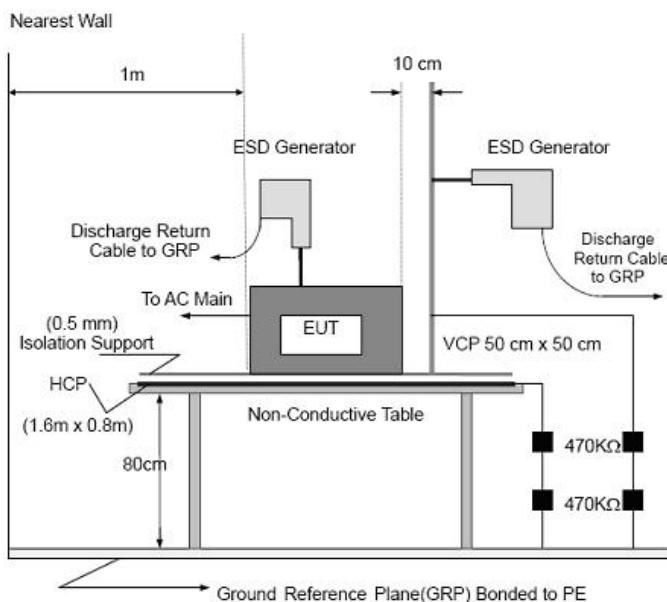
Standard	Criterion
ETSI EN301489-17	Criteria B

TEST LEVEL

Contact Discharge at $\pm 2\text{kV}$, $\pm 4\text{kV}$

Air Discharge at $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Air Discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT.

Indirect discharge for vertical coupling plane:

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The

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coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

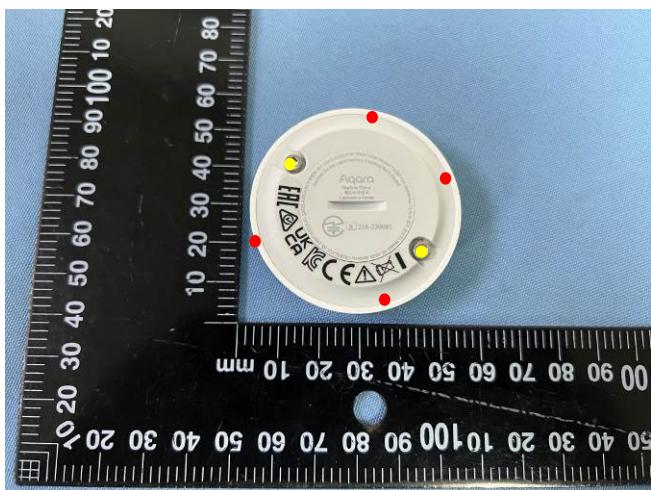
Test mode		1			
Temperature	25°C	Humidity	49%	Atmospheric pressure	101KPa
Test Points	Test Voltage	Kind	Times	Results	Test Result
HCP	<input checked="" type="checkbox"/> ±2 kV ; <input checked="" type="checkbox"/> ±4 kV <input type="checkbox"/> ±6 kV ; <input type="checkbox"/> ±8 kV <input type="checkbox"/> ±10 kV ; <input type="checkbox"/> ±15 kV	<input type="checkbox"/> Air <input checked="" type="checkbox"/> Contact	<input checked="" type="checkbox"/> ±10 <input type="checkbox"/> ±25	A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
VCP	<input checked="" type="checkbox"/> ±2 kV ; <input checked="" type="checkbox"/> ±4 kV <input type="checkbox"/> ±6 kV ; <input type="checkbox"/> ±8 kV <input type="checkbox"/> ±10 kV ; <input type="checkbox"/> ±15 kV	<input type="checkbox"/> Air <input checked="" type="checkbox"/> Contact	<input checked="" type="checkbox"/> ±10 <input type="checkbox"/> ±25	A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Contact Discharge	<input checked="" type="checkbox"/> ±2 kV ; <input checked="" type="checkbox"/> ±4 kV <input type="checkbox"/> ±6 kV ; <input type="checkbox"/> ±8 kV <input type="checkbox"/> ±10 kV ; <input type="checkbox"/> ±15 kV	<input type="checkbox"/> Air <input checked="" type="checkbox"/> Contact	<input checked="" type="checkbox"/> ±10 <input type="checkbox"/> ±25	A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Air Discharge	<input checked="" type="checkbox"/> ±2 kV ; <input checked="" type="checkbox"/> ±4 kV <input checked="" type="checkbox"/> ±6 kV ; <input checked="" type="checkbox"/> ±8 kV <input type="checkbox"/> ±10 kV ; <input type="checkbox"/> ±15 kV	<input checked="" type="checkbox"/> Air <input type="checkbox"/> Contact	<input checked="" type="checkbox"/> ±10 <input type="checkbox"/> ±25	A	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
* Comment: <input checked="" type="checkbox"/> No degradation was found <input type="checkbox"/> Phenomenon Description					

Note:

The ancillary equipment's specification for an acceptable level of performance or degradation of performance during and/or after the ESD tests.

Description of Discharge Point

Contact discharge-Yellow, Air discharge-Red



4.3. Radio Frequency Electromagnetic Field

PERFORMANCE CRITERION

Standard	Criterion
ETSI EN301489-17	Criteria A

TEST LEVEL

Test frequency range: 80MHz~6000MHz

Level: 3V/m (Un-modulation)

Modulation type: Amplitude Modulation, 80% depth

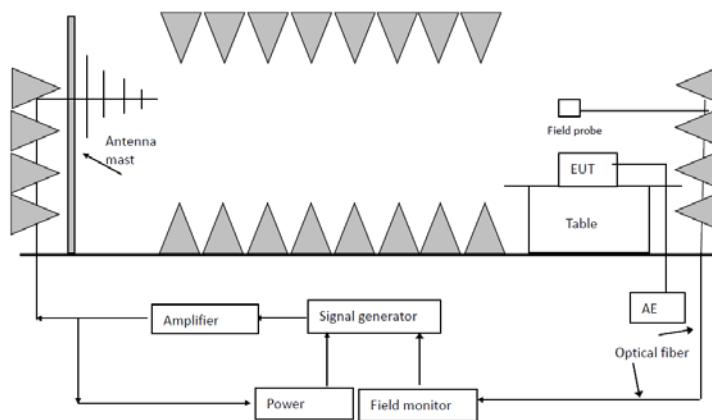
Modulated signal: 1KHz sinusoidal audio signal, 400Hz sinusoidal audio signal for audio breakthrough

Frequency increment step: 1%

Dwell time: 3 seconds

A spot frequency test shall be performed at 920 MHz \pm 1 MHz using a test level of 3 V/m (measured Un-modulated) 100 % modulated by 200 Hz pulses of equal mark to space ratio.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and EN 61000-4-3 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

**TEST RESULTS**

Test mode		1			
Temperature	24°C	Humidity	50%	Atmospheric pressure	101kPa
EUT Position	Frequency range: 80-6000 MHz Level: <input checked="" type="checkbox"/> 3V/m <input type="checkbox"/> 10V/m				Test Result
	Horizontal	Vertical			
Front	A	A		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Right	A	A		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Back	A	A		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Left	A	A		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

***Comment:**

- No degradation was found
 Phenomenon Description

4.4. Fast Transients Common Mode

PERFORMANCE CRITERION

Standard	Criterion
ETSI EN301489-17	Criteria B

TEST LEVEL

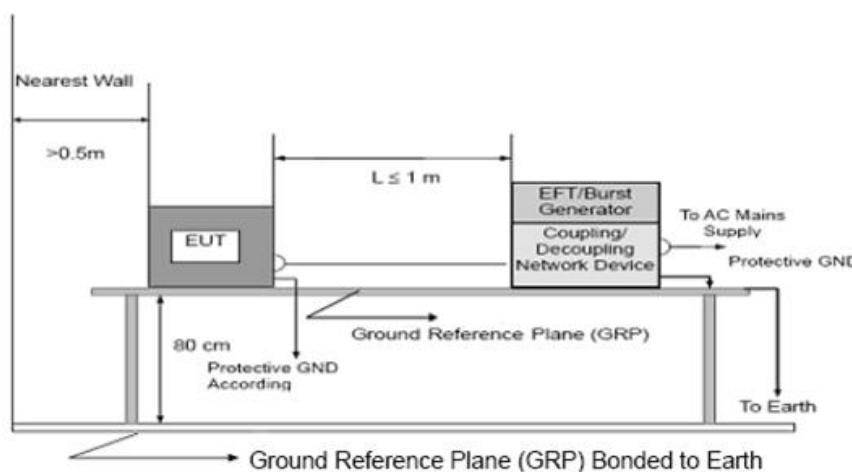
Level: 1kV for AC port, 0.5kV for signal port

Impulse Frequency: 5 kHz;

Tr/Td: 5/50ns;

Burst Duration: 15ms; Burst Period: 300ms

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

4.5. Surge

PERFORMANCE CRITERION

Standard	Criterion
ETSI EN301489-17	Criteria B

TEST LEVEL

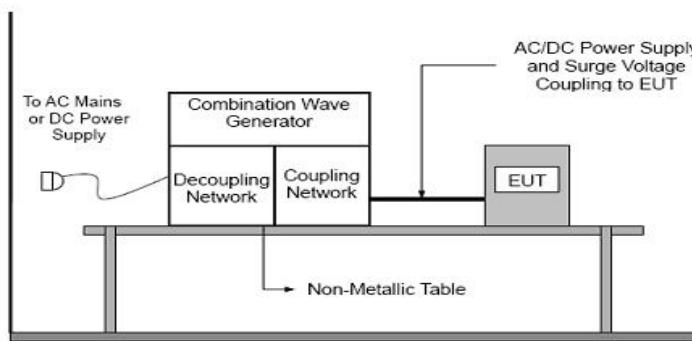
Level: 1kV for line to line, 2kV for line to ground, 1kV for signal line

Voltage Waveform: 1.2/50 us; Current Waveform: 8/20 us

Pulse quantity: 5, interval time: 60 seconds

Phase: 0°, 90°, 180°, 270°

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

4.6. Radio frequency common mode

PERFORMANCE CRITERION

Standard	Criterion
ETSI EN301489-17	Criteria A

TEST LEVEL

Test frequency range: 150 kHz~80MHz

Level: 3Vrms

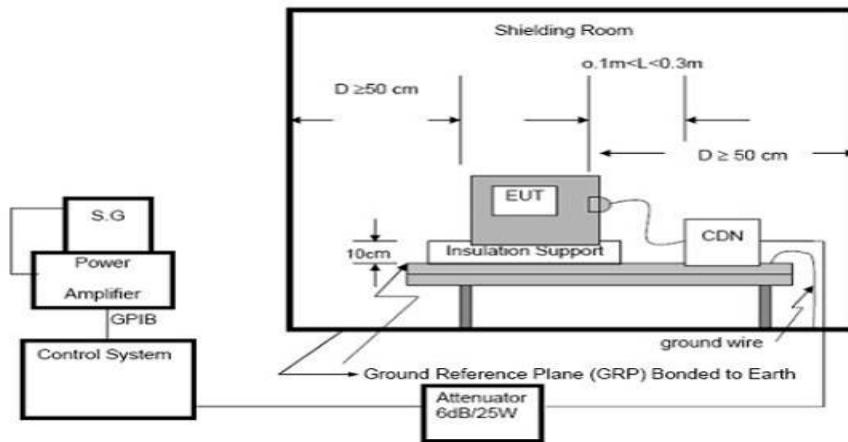
Modulation type: Amplitude Modulation, 80% depth

Modulated signal: 1 KHz sinusoidal audio signal, 400Hz sinusoidal audio signal for audio breakthrough

Frequency increment step: 1%

Dwell time: 3 seconds

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2 and EN 61000-4-6 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

4.7. Voltage dips and interruptions

PERFORMANCE CRITERION

Standard	Criterion
ETSI EN301489-17	Criteria B for voltage dip Criteria C for voltage interruption

TEST LEVEL

0% of VT (Supply Voltage) for 0.5 period

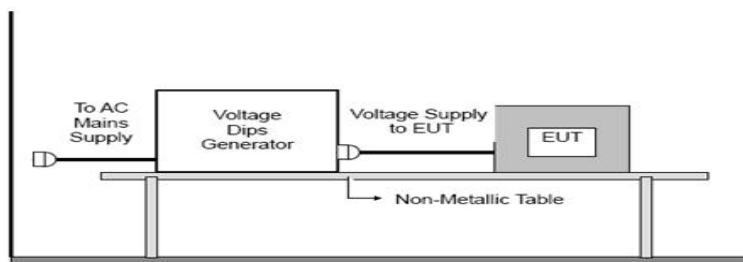
0% of VT (Supply Voltage) for 1 period

70% of VT (Supply Voltage) for 25 period

0% of VT (Supply Voltage) for 250 period

Dip quantity: 3, interval time: 10 seconds

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods.

TEST MODE

Please refer to the Clause 2.4

TEST RESULTS

Note: The test item is not applicable.

5. EUT TEST PHOTOS

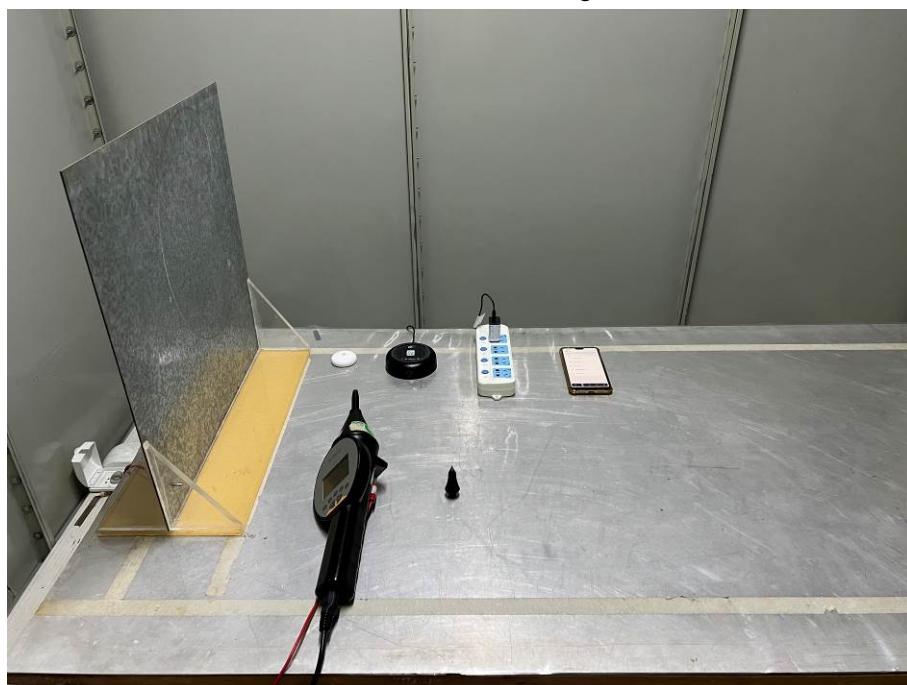
Radiated Measurement (30MHz~1000MHz)



Radiated Measurement (1000~6000MHz)



Electrostatic Discharge



RF electromagnetic field (80MHz~1000MHz)



RF electromagnetic field (Above 1000MHz)

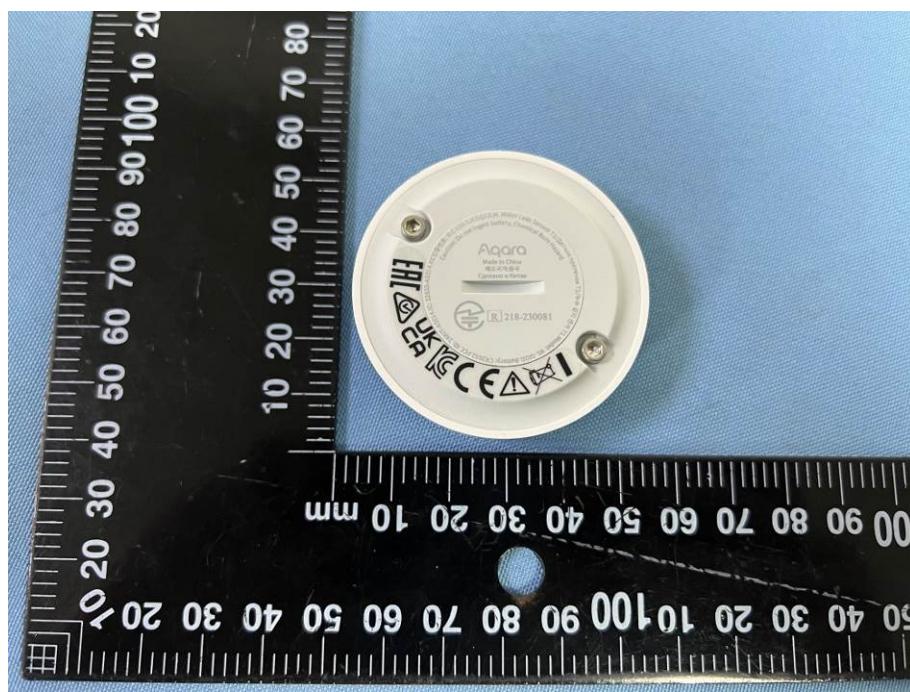
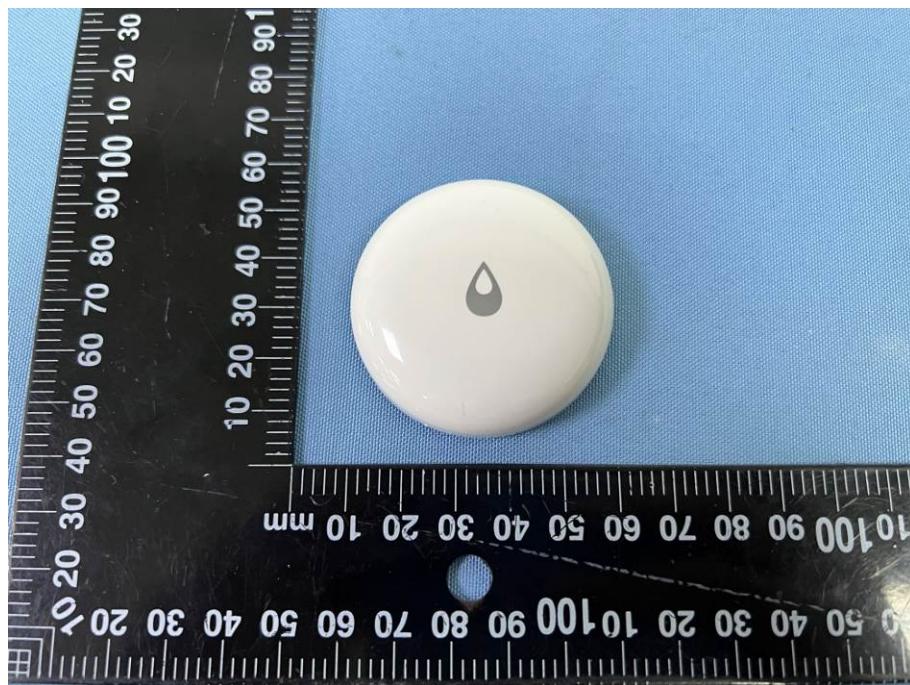


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6. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

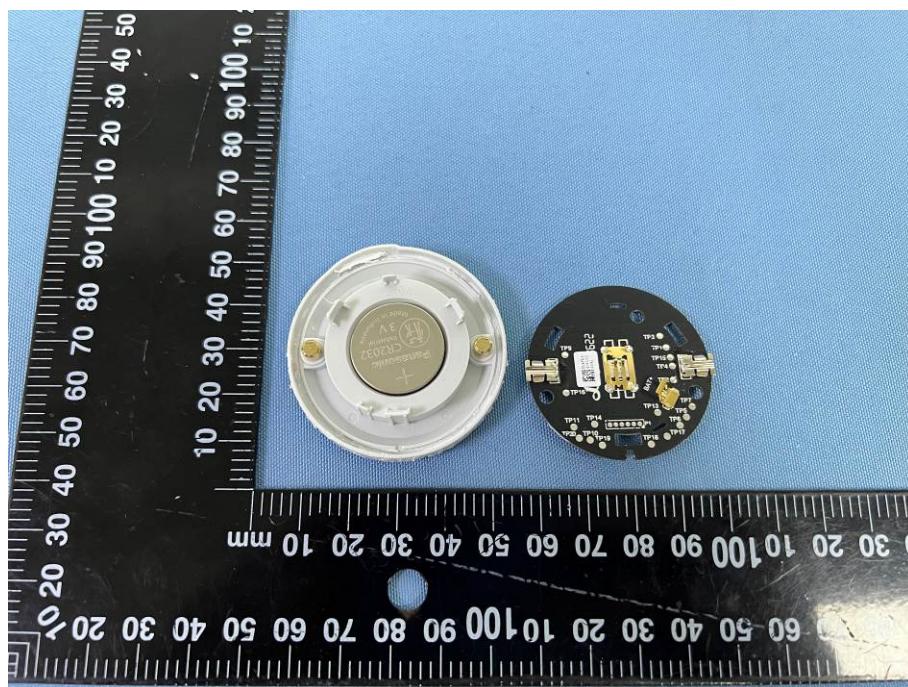
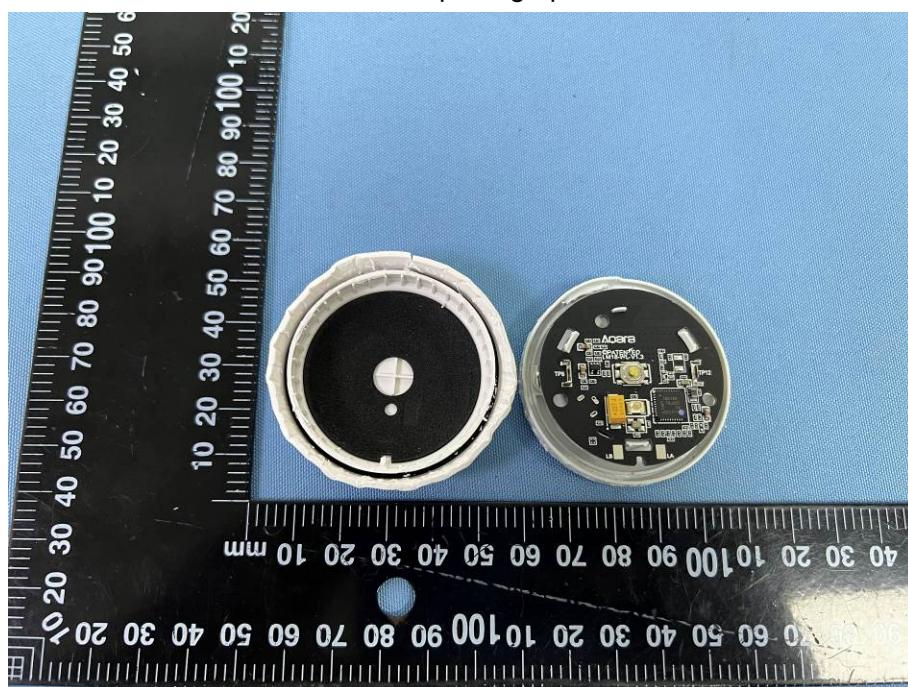
External Photographs

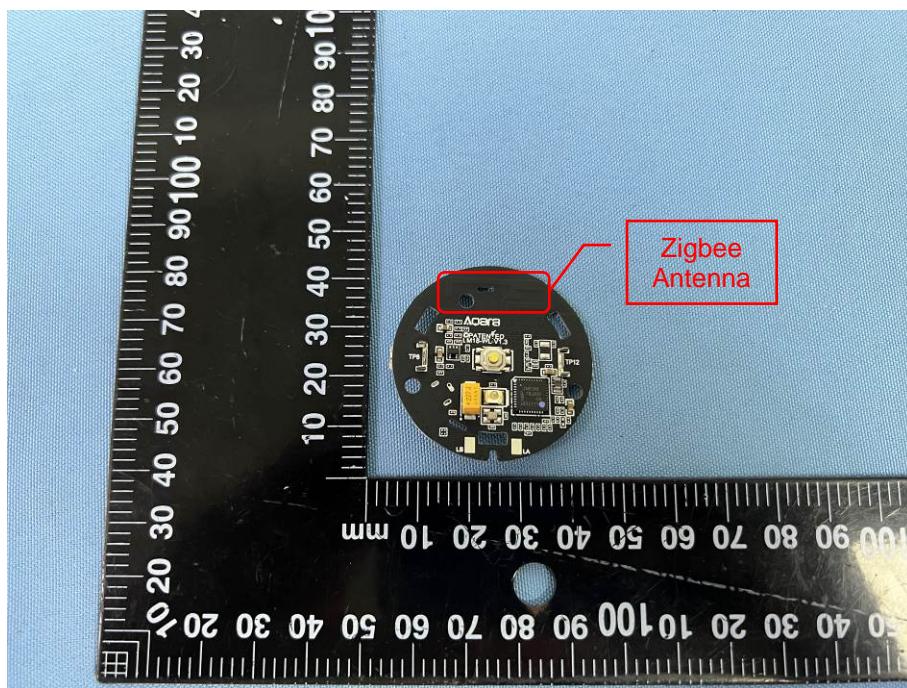
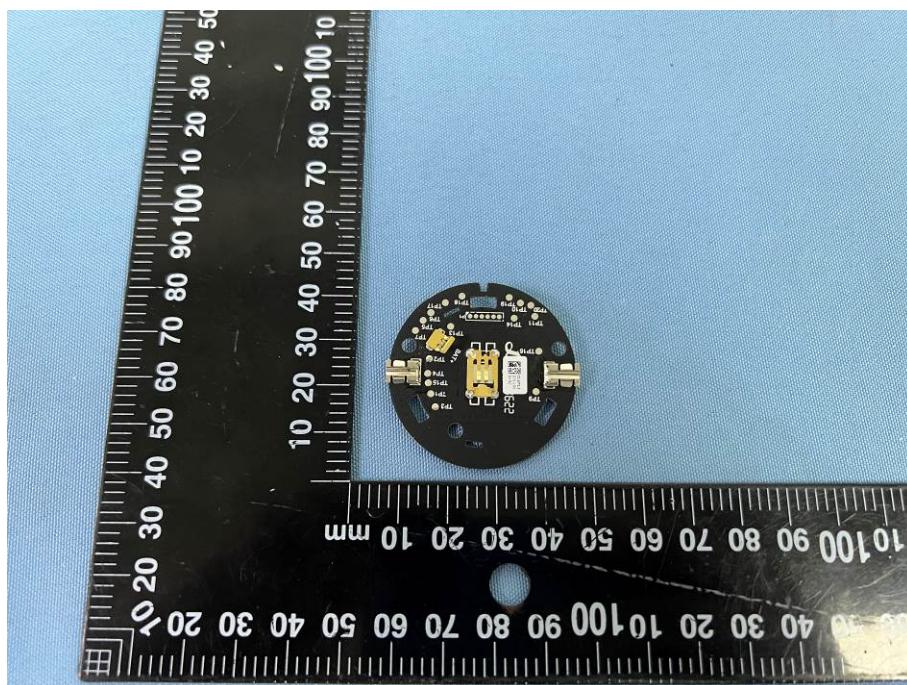






Internal photographs





*****THE END*****